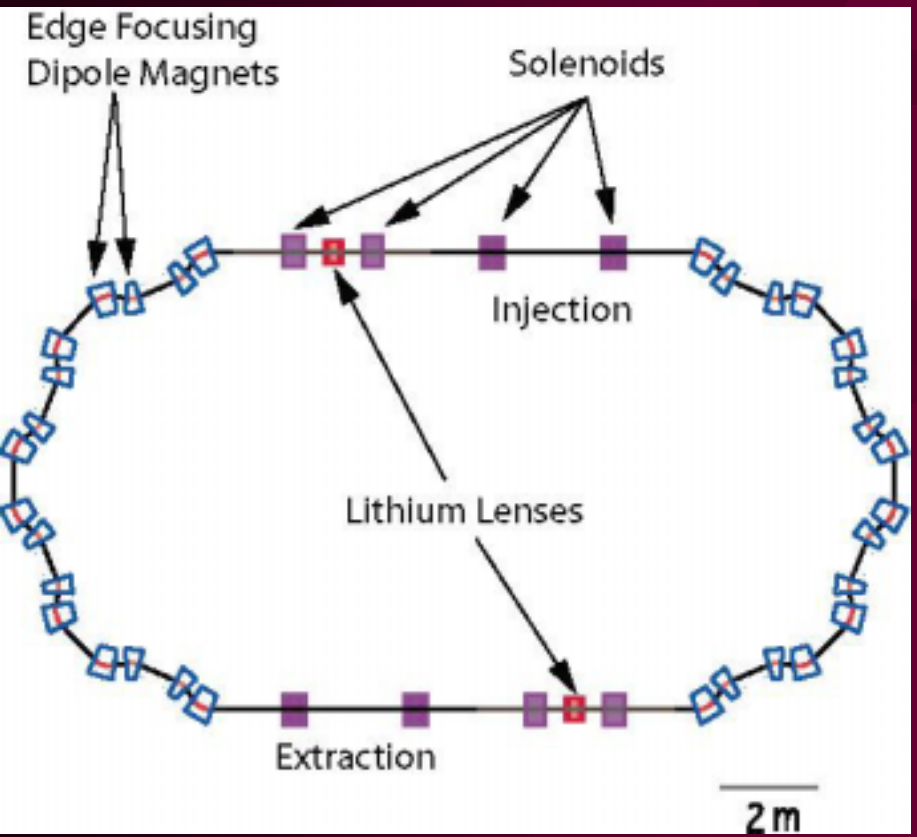
Lithium Lens Ring Cooler

Yasuo Fukui(UCLA)

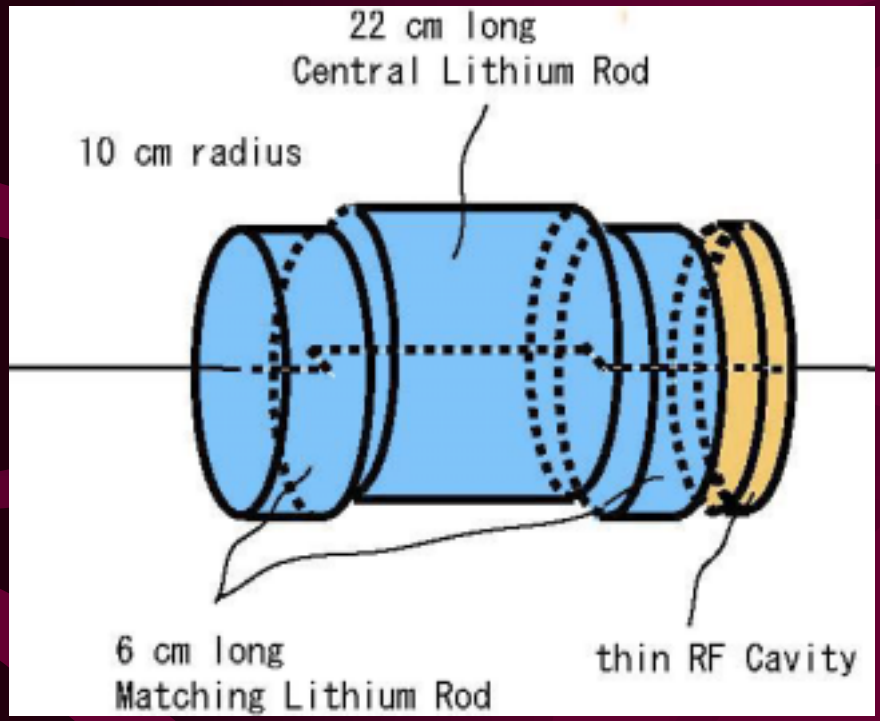
Thanks to Al Garren, Dave Cline, Harold Kirk
for modeling/discussion

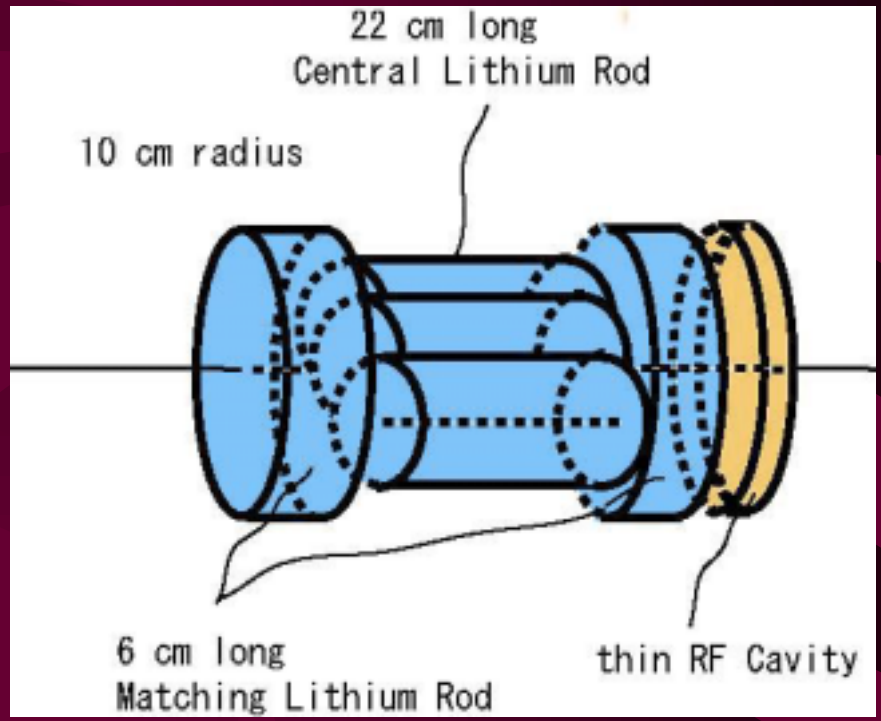


(by Al Garren)

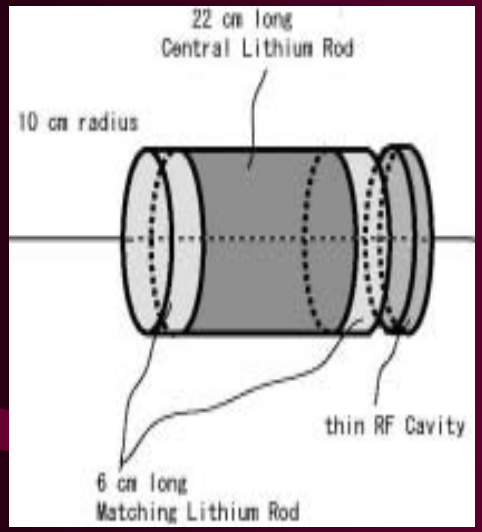
- Transverse Cooling has been demonstrated with ***linear*** model.
- Longitudinal cooling is not done at all.
- Work is in progress to use COSY to get non-linear model, then plan to simulate with ICOOL.

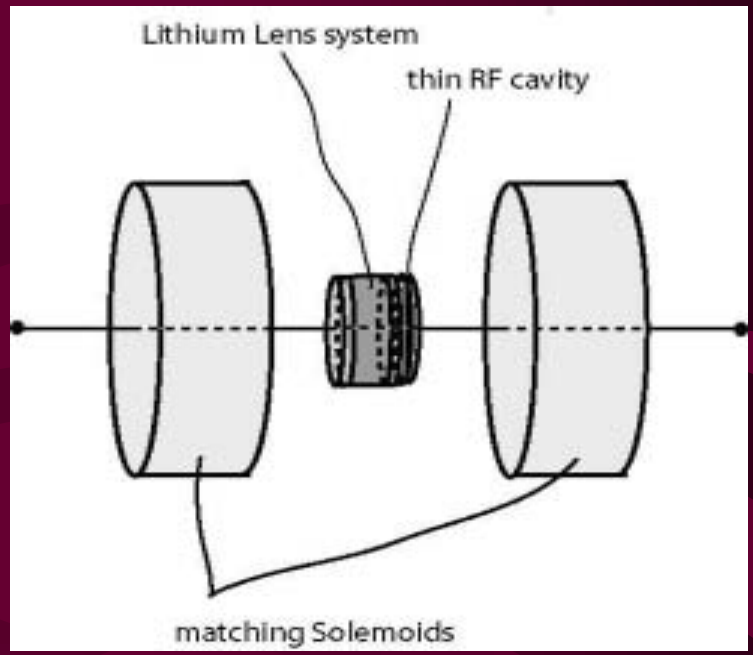
Lithium Lens in Dispersive Region for Emittance Exchamge

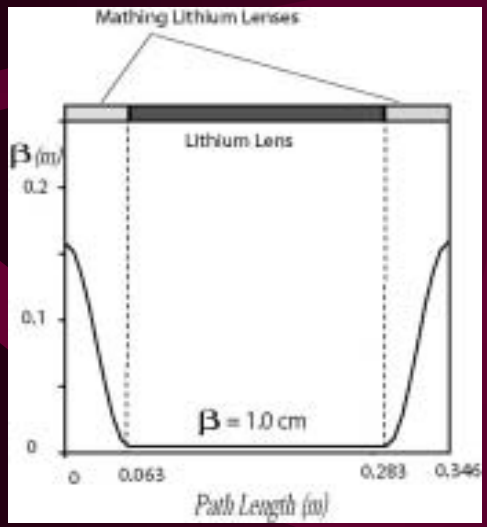


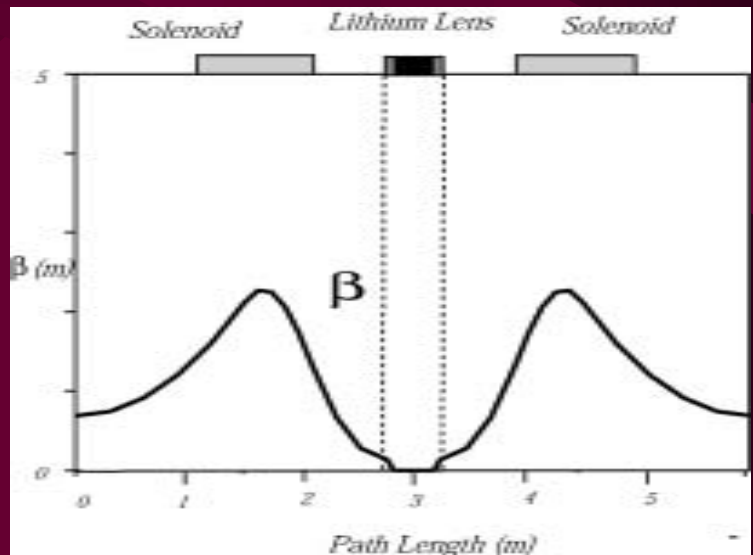


Straight Li lens channels



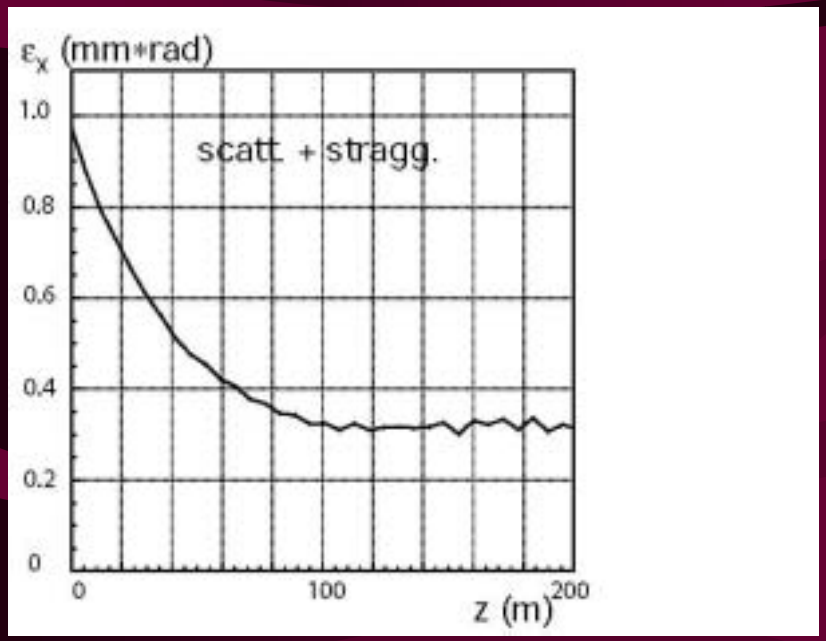


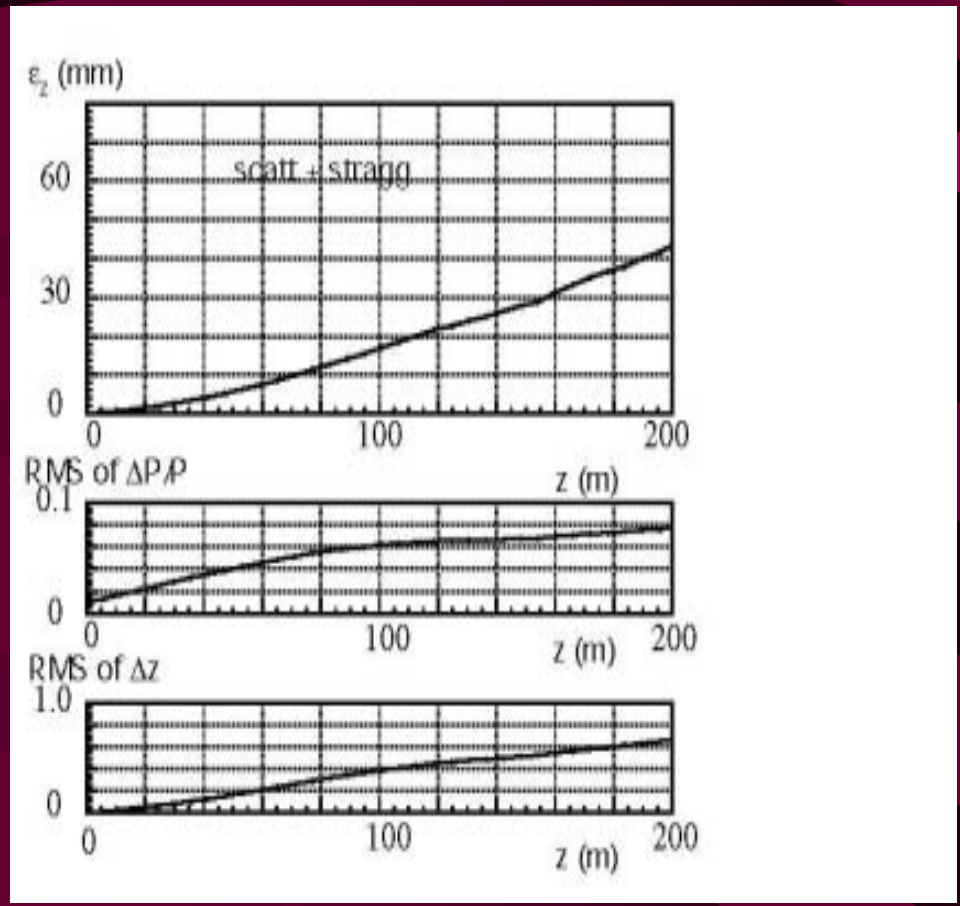


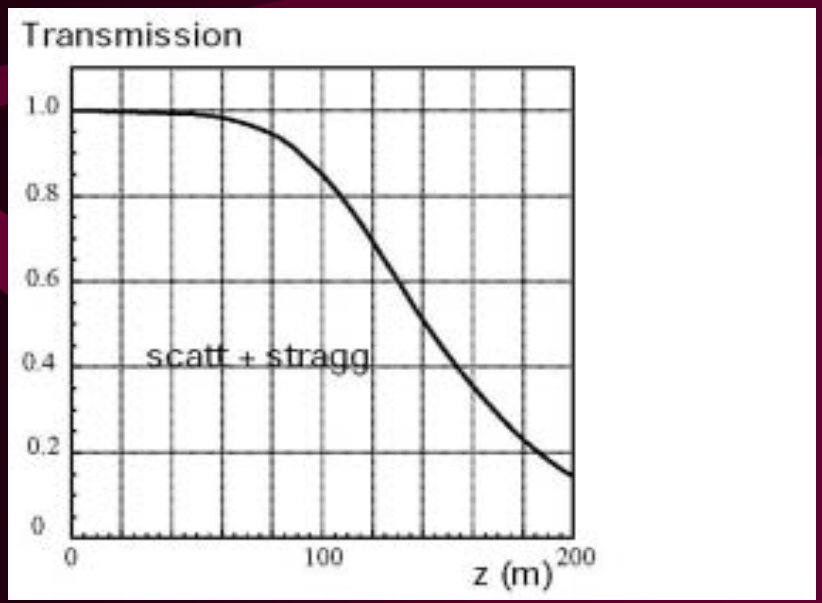


<β>=3.7 cm

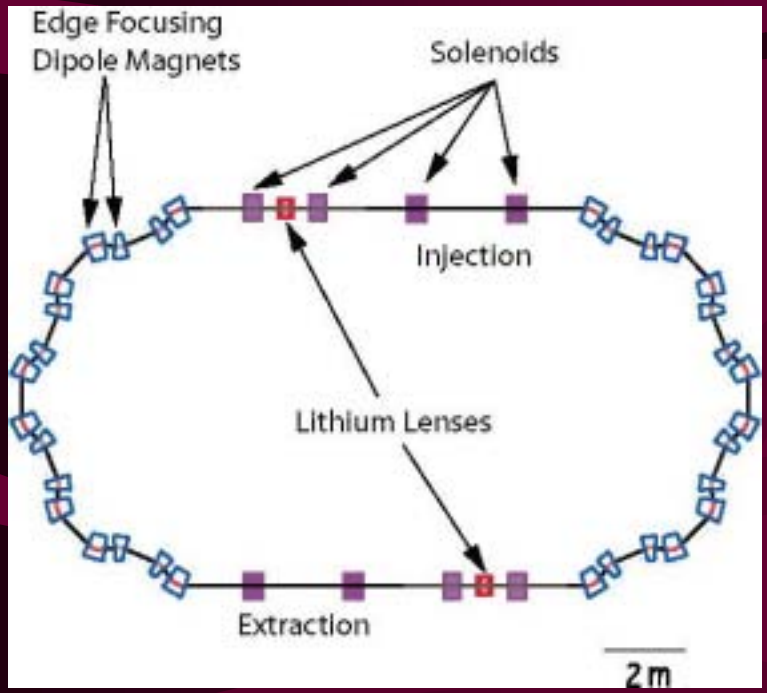
Straight Li Channels



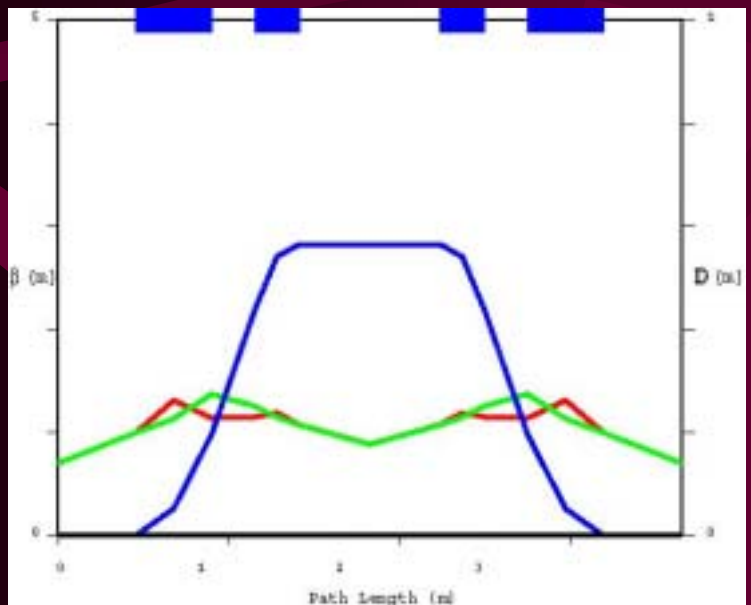


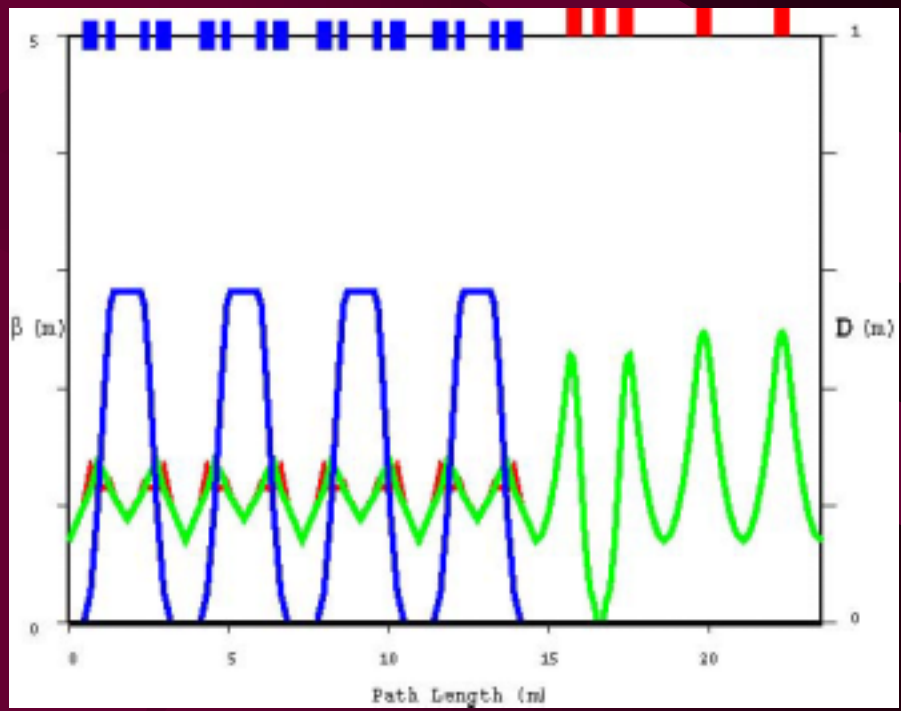


Lithium Lens Ring

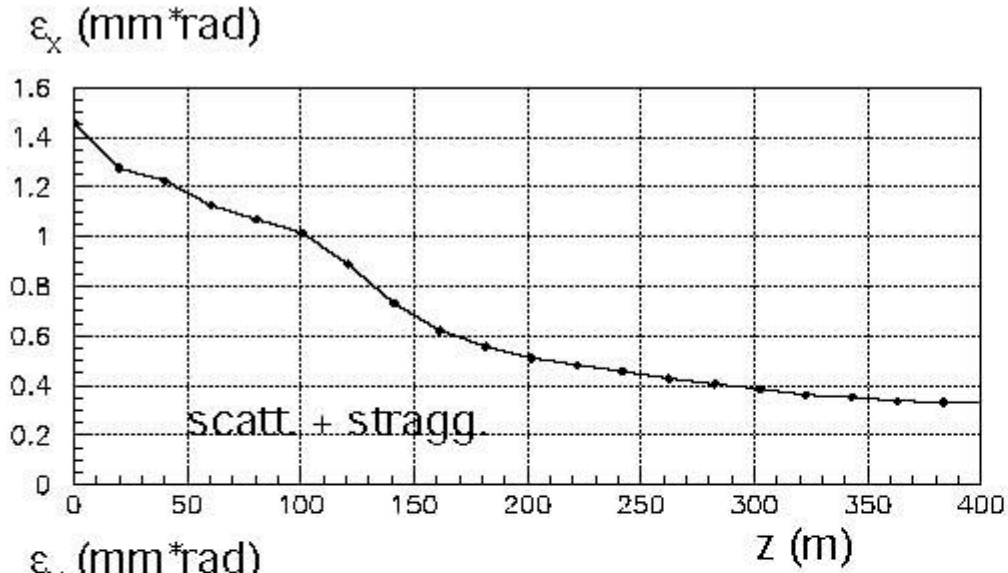


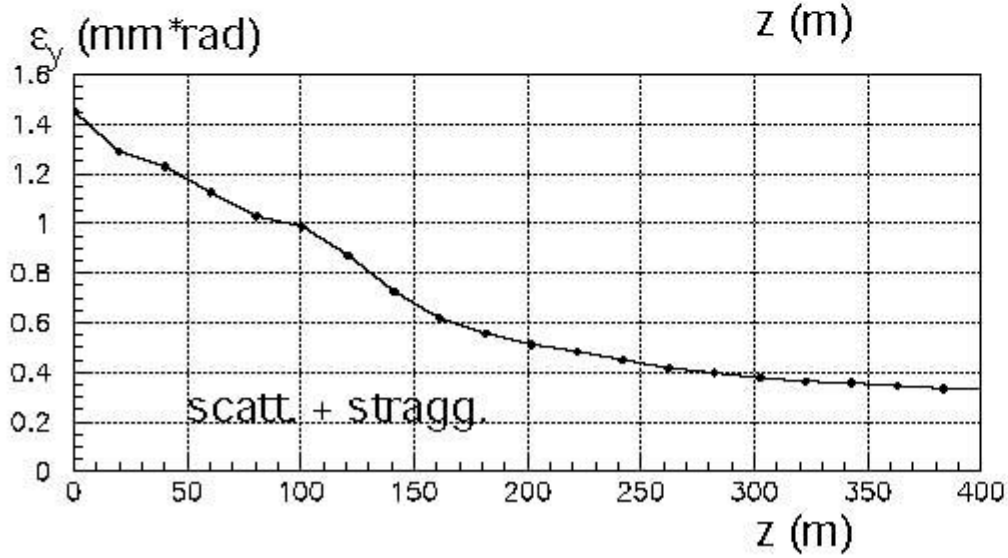
(by Al Garren)



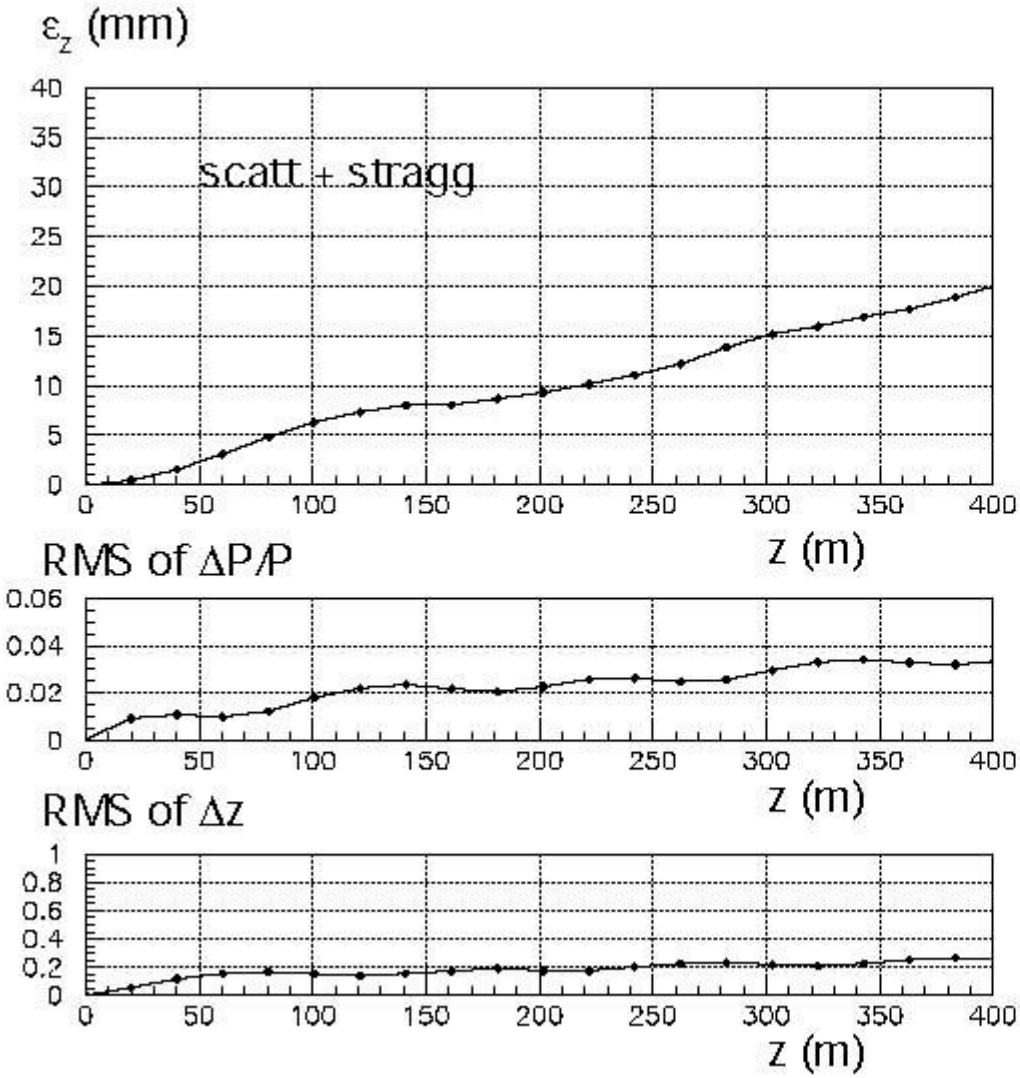


Lithium Lens Ring

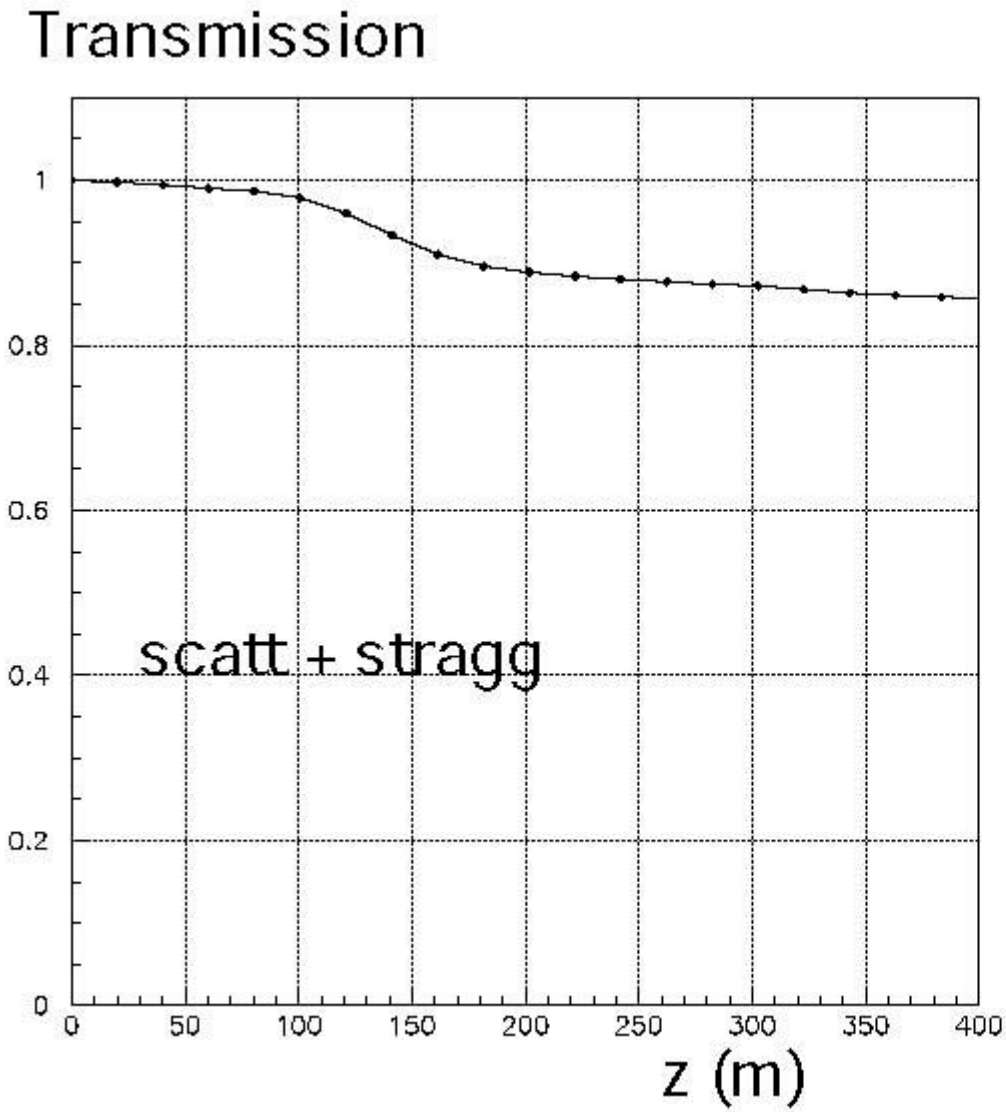




Lithium Lens Ring



Lithium Lens Ring



Lithium Lens Ring

Parameters of a muon cooling ring

muon momentum	250 MeV/c
Circumference	42.1 m
straight section length	5.9 m (x 2)
Structure of half cell	2 dipoles with edges
number of bending cells	8
bend cell length	3.6 m
length of Lithium lens	34.5 cm (x 2)
Lowest/highest β in Li	1.0 cm /16 cm
dE/dx	35 MeV/turn (x 2)
dipole bend angles	44.2, -21.7 degree
dipole edge angles	30/-3, -11/-11 degree
dipole magnetic field	6.5, -3.2 tesla
Cell tunes bend cell	0.72/0.70
Cell tunes straight cell	4.0

Summary

- Transverse cooling down to 0.3 mm*rad was demonstrated in a Cooling Ring.
- COSY does not have a Lithium Lens. Need to be CREATED.

SYNCH Linear model
COSY non-linear model
ICOOL simulation (as realistic as possible)

- GEANT simulation for a cross check?
- Fitting in a global scheme of a $\mu^+\mu^-$ collider.